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Policy Review: State Legislature, Voters Move to Eighty-Six Texas's Flooding Challenges

Matthew D. Berg[1]

Abstract: Even before the 86th Texas Legislature began, it was clear the session would feature a deluge of activity focused on addressing Texans' experience with flooding. Elected representatives from across the state floated solutions for Hurricane Harvey and long-term issues alike, featuring a mix of both recovery projects and future planning efforts. Much attention has been paid to Senate Bill 7 and Senate Bill 8, which create major new statewide programs. Significant questions remain regarding the implementation of these bills. We wade into these uncertainties and the larger trends behind the legislative session. In all, 128 introduced bills specifically mentioned "flooding" or "flood," far exceeding anything from the previous 10 sessions. Even more, 240 total introduced bills addressed issues with a clear connection to flooding. Of these, 67 (28%) went on to become legislation. As new laws go into effect, implementation ramps up, and funds trickle out, strong, sustained stakeholder engagement and communication will be key to making sure these programs hold water.

Keywords: flood, planning, infrastructure, recovery, resiliency

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Terms used in paper

Acronym	Descriptive term
FEMA	Federal Emergency Management Agency
GLO	General Land Office
HB	House Bill
HCFCD	Harris County Flood Control District
HJR	House Joint Resolution
HUC	Hydrologic Unit Code
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
SB	Senate Bill
SJR	Senate Joint Resolution
SWIFT	State Water Implementation Fund for Texas
TCEQ	Texas Commission on Environmental Quality
TDEM	Texas Division of Emergency Management
TSSWCB	Texas State Soil and Water Conservation Board
TWDB	Texas Water Development Board
USACE	U.S. Army Corps of Engineers
VFD	Volunteer Fire Department

LEGISLATURE OVERVIEW

Hurricane Harvey was a powerful and effective catalyst, but the pressure to address Texas's unfortunate struggles with flooding had been growing for some time. Texas leads the nation in declared flooding disasters (FEMA 2019). Peak flows in a number of the state's rivers and streams have been trending upward (Berg 2018). NOAA released its analysis indicating increased estimates of heavier downpours across a wide swath of the state (Perica et al. 2018) (Figure 1). With clear interim charges added to the mix (Patrick 2017a; Patrick 2017b; Straus 2017), it was a perfect storm of legislative motivation. As momentum built toward the convening of the 86th Texas Legislature, the only question was where it would all lead.

It did not take long to start finding out. Several bills had been pre-filed by the end of November 12, the very first day legislators could file, and a steady stream continued to flow well into the session itself. Meanwhile, in a poetic twist, the 6 months leading up to the session were the wettest July-December period ever recorded in Texas (NOAA 1895–). This soggy reminder had an effect. Introduced bills with the words "flood" or "flooding" (128 bills) set a new high-water mark for a single legislative session and significantly overtopped those addressing "drought" (28 bills) considerations (TLO 2019) (Figure 2).

Taking a broader view, the number of bills with a substantive, material connection to flooding was far larger. By the filing deadline, a raft of 240 flood-related bills had been introduced. These came from districts all across the state, with a clear concentration in a band running from the Beaumont-Port Arthur area through the southern Hill Country (Figure 3). In terms of primary authorship, the greatest numbers of such bills were introduced by Senator Lois Kolkhorst and Senator Carol Alvarado in the Senate and Representative Armando Walle and Representative Ed Thompson in the House of Representatives. If the frequency of discussion indicates the importance of a topic, flooding was very much a focus of the 86th legislative session.

This was not a surprise. As expected, many introduced bills focused on adjusting ad valorem taxation in the wake of natural disasters. There was also significant competition among bills regarding the communication of flood risk in property transactions. What was breathtaking, however, was the staggering scope of additional issues touched on by flood legislation. Wading into the bills reveals so much more (Appendix A). This does not even include those bills, such as House Bill (HB) 3167 (Oliverson), that impact the ability of local political subdivisions to plan for and respond to the threats posed by flooding. Yet more bills were slightly less connected with

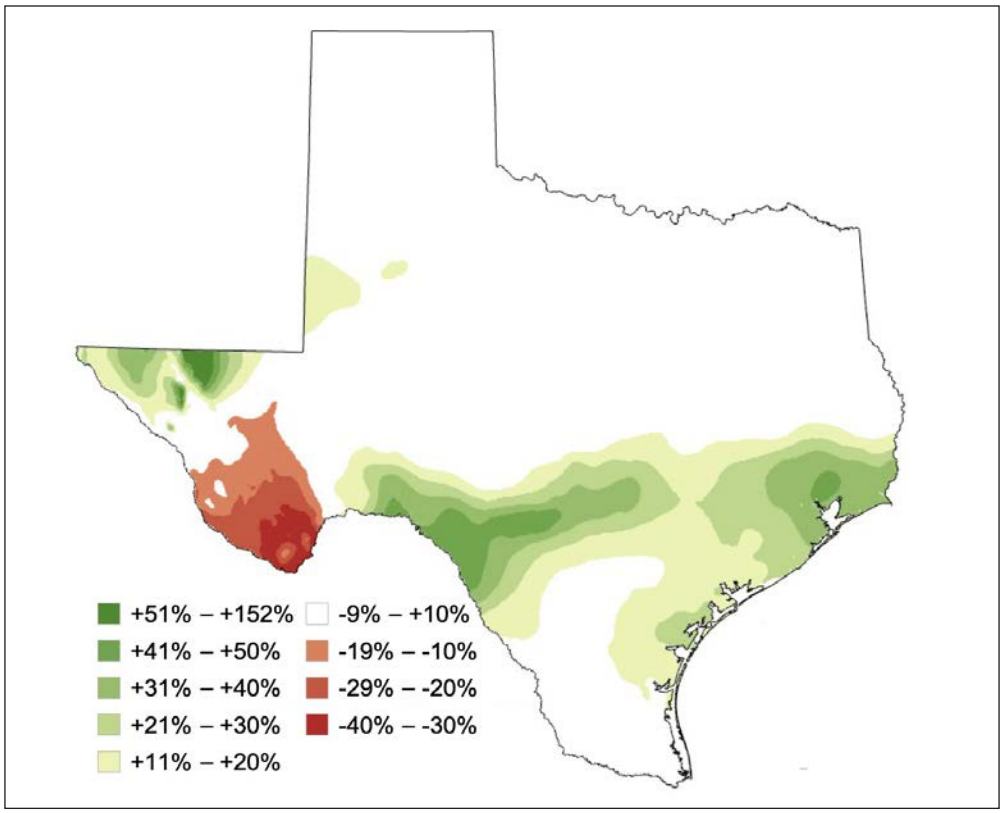

Figure 1. Extending from southeast Texas along the Louisiana border to just east of the Big Bend region and also including the northern portion of the Trans-Pecos, a swath of Texas registered significant increases in the so-called 100-year (1% annual chance) storm since the last time these estimates were calculated. The map indicates percent differences in 100-year, 24-hour rainfall depths between Weather Bureau Technical Paper No. 40 (Hershfield 1961) and NOAA Atlas 14 (Perica et al. 2018). Adapted from NOAA Atlas 14 with permission from authors.

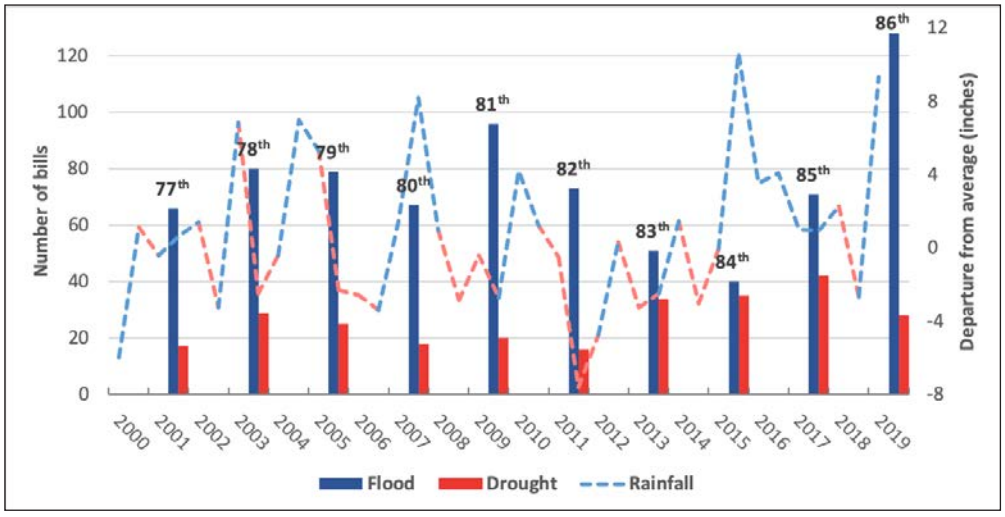

Figure 2. Frequency of bills introduced in Texas Legislature specifically addressing "drought" (red bars) and "flooding" (blue bars) in relation to statewide precipitation trends. Light red dashed lines signify a six-month period ending with below average statewide precipitation. Light blue dashed lines signify a six-month period ending with above average statewide precipitation. Extremely wet periods often translate to flood-related bills in the following session, but nothing comes close to the 86th Legislature in terms of bill volume.

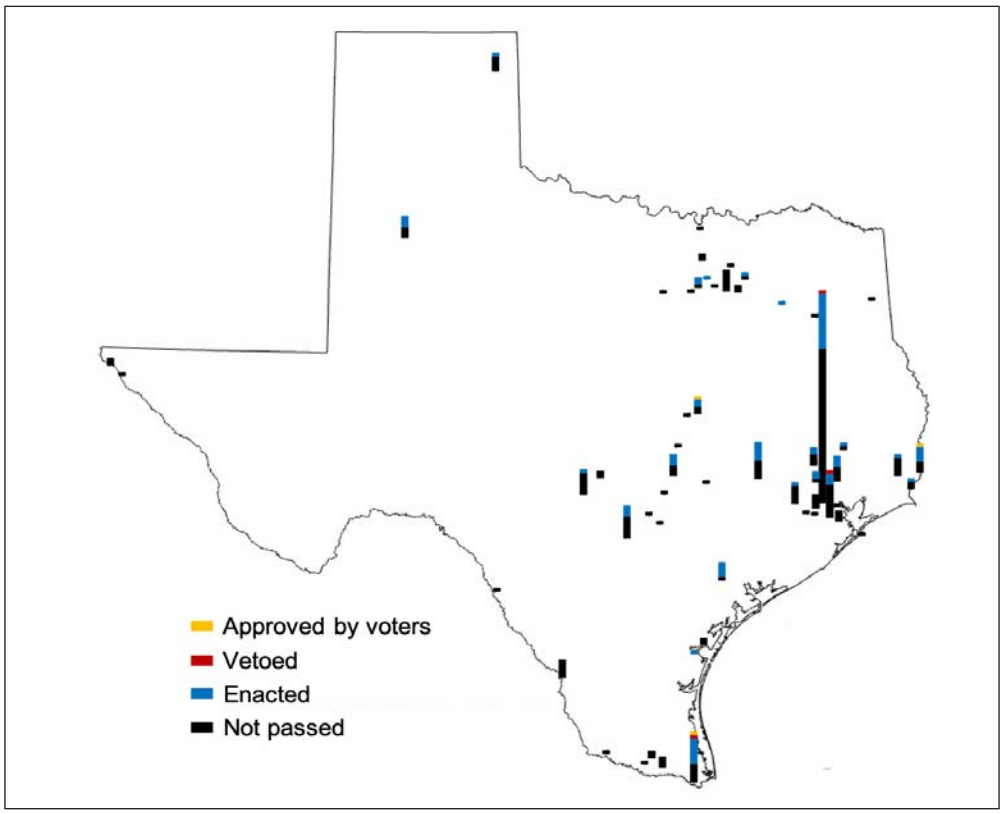

Figure 3. Map of flood bills and their respective fates by the primary district office location of the bill's primary author. Bills with a substantive, material connection to flooding were introduced by elected representatives from across the state. However, far and away the greatest numbers were introduced by representatives from southeast Texas near the Louisiana border, through the Houston metropolitan area and to the southern Hill Country.

flooding concerns but still tangentially relevant. Clearly rising waters had permeated essentially every aspect of Texans' lives.

Perhaps just as fascinating as the bills enacted are the contents of those that did not make it that far. A whopping 167 flood-related bills (70%) were introduced but did not progress to the Governor's desk. This list was heavily populated by competing versions of related bills that failed to become the preferred legislation. Other dead bills include the potential use of U.S. Postal Services workers during natural disasters, an examination of the flooding impacts of border wall construction, the development of a list of voluntary best practices for aggregate production operations, and the location of solid waste facilities in relation to floodplains, among many, many more.

There were also several bills prescribing studies and authorizing commissions to address changing weather patterns and climate issues. None passed. Interestingly, the overwhelming majority (71%) of all flood-related bills were from legislators with district offices within areas identified by NOAA's Atlas 14 as having experienced significant increases in 100-year rainfall depths (Figure 4).

A handful of additional bills were passed by the legislative branch but received Governor Abbott's veto. HB 2112 (Ed Thompson) addressed the salvage of flood-damaged vehicles but was disapproved in favor of procedures laid out in HB 2310 (Vo) (Abbott 2019c). Senate Bill (SB) 1575 (Alvarado) addressed municipal immunity for pass-through administration of state and federal disaster recovery funds. Governor Abbott determined this legislation to be too protective and vague (Abbott 2019b). HB 1059 (Lucio III) prescribed a biennial report on green stormwater infrastructure through the Texas Commission on Environmental Quality (TCEQ). This bill was declared redundant and unnecessary, and it was suggested that a combination of current efforts by local governments and higher education institutions is sufficient (Abbott 2019a).

The fate of three additional legislative proposals was settled later in the year. House Joint Resolution (HJR) 4 (Phelan), HJR 34 (Shine), and Senate Joint Resolution (SJR) 79 (Lucio) accompanied additional bills already passed by the Legislature and received overwhelming approval as constitutional amendments by Texas voters in the November 5 general election. HJR 4 (Proposition 8) proposed the creation of a dedicated Flood Infrastructure Fund to finance drainage, flood mitigation, and flood control projects. HJR 34 (Proposition 3) proposed a temporary partial exemption from ad valorem taxation of

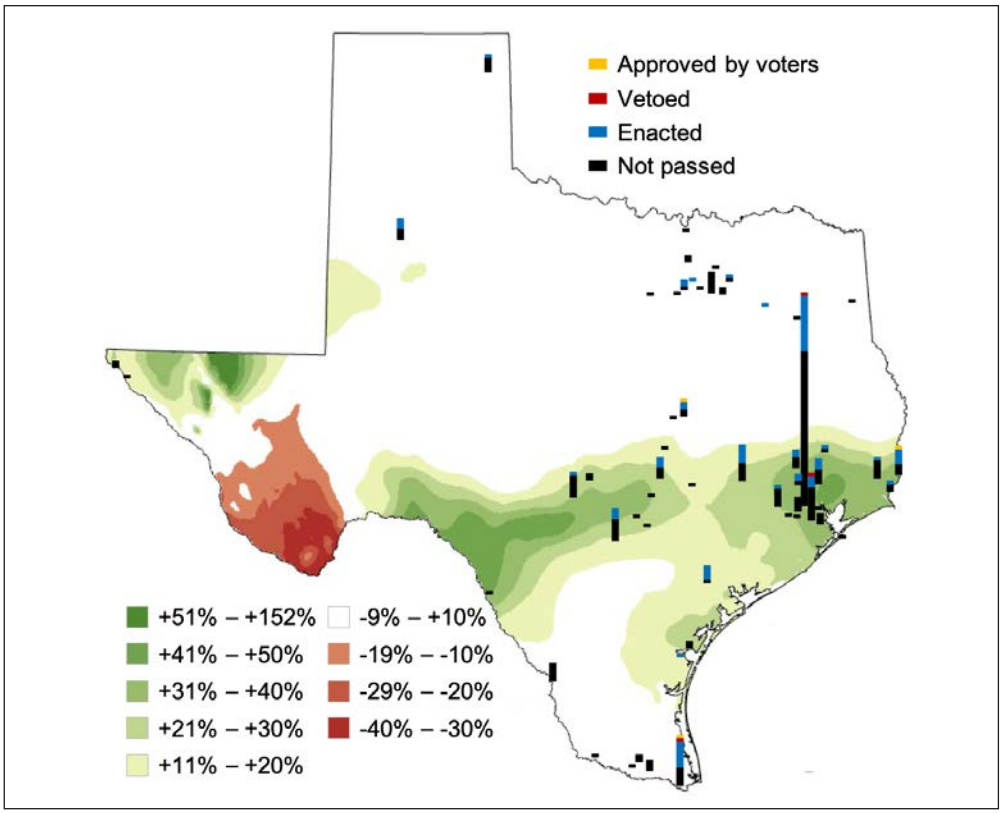

Figure 4. Map of introduced bills and their respective fate in relation to precipitation changes identified in NOAA Atlas 14 (Perica et al. 2018), a combination of Figures 1 and 3. The vast majority (71%) of flood-related bills were introduced by representatives whose districts experienced significant increases in 100-year (1% annual chance) rainfall depths. Legislative initiatives appear to reflect changing precipitation conditions.

disaster-damaged property. SJR 79 (Proposition 2) proposed the issuance of bonds by the Texas Water Development Board (TWDB) to fund projects in economically distressed areas, though this was amended by legislators from its introduced form to exclude drainage projects.

Some 67 bills related—as filed—to flooding (28%) did successfully navigate the legislative process to become law, with the greatest number authored by Senator Kolkhorst and Senator Lucio in the Senate and Representative Morrison and Representative Phelan in the House. At least one more of these, SB 2452 (Lucio), which enabled SJR 79, initially included fund eligibility for drainage projects but was pared down over the course of the legislative process. As with the number of bills introduced overall, the scope of passed bills is incredibly extensive. Bill language was awash in acronyms of almost every state agency. A brief summary of passed legislation is found in Appendices B and C.

While all of these will bring changes to the lives of Texans, a handful of bills have received outsized attention. SB 7 (Creighton), in conjunction with HJR 4, and SB 8 (Perry) continue to dominate flood conversations in the state and were the focus of statewide stakeholder meetings in 2019. They are also the bills with perhaps the greatest amount of uncertainty. Yet significant work is underway to clear up the unknown.

SMALL BILL NUMBERS, HUGE EXPECTATIONS

As has been made very clear by essentially all stakeholders and outlined in the State Flood Assessment (TWDB 2019b), significant funding is the biggest need in order to mitigate flooding and manage floodplains across the state. SB 7 and SB 8 in particular make meaningful progress toward meeting that need by establishing a process to identify projects and target resources.

The applause accompanying the passage of SB 7 and HJR 4 in the legislative chambers reflects the hope both legislators and private citizens place in these bills. Discussion on the floor featured abundant reflection on Hurricane Harvey and personal war stories of flooding. These bills work hand in hand with SB 8 and the supplemental appropriations bill SB 500 (Nelson) and seek to accelerate recovery from the most recent storms while aiming to build a foundation of resilience to future events.

Senate Bill 7

SB 7 provides a significant retooling of flood projects and disaster recovery for Texas. And since doing anything costs money, the legislation importantly establishes the Flood Infrastructure Fund to finance all phases of flood and drainage projects in the form of grants and low-cost loans. Through an appropriation from the Economic Stabilization Fund, SB 500 assigns $793 million for this purpose. These funds will be directed to political subdivisions (counties, municipalities, river authorities, and other special districts). It is hoped that this mechanism will help communities overcome the cost hurdles and lengthy timelines associated with large infrastructure projects.

The adoption of the first state flood plan looms as a major milestone for the Flood Infrastructure Fund. Before that time, this fund will be used to finance flood projects that are developed through a cooperative planning process (TWDB 2019a). After regional flood plans are compiled into a state flood plan in 2024, the Flood Infrastructure Fund must be used exclusively for projects featured in the state flood plan. With 78% of more than 1.5 million Texas voters supporting Proposition 8, the Flood Infrastructure Fund is officially created outside the general revenue fund and will be carried forward in future budget cycles.

In addition to the statewide referendum, SB 7 also establishes the $857 million Texas Infrastructure Resiliency Fund through an appropriation from the Economic Stabilization Fund. A major goal of the Texas Infrastructure Resiliency Fund is to provide the Texas Division of Emergency Management (TDEM) with matching local funds ($638 million) to leverage the multitude of different federal funds in ongoing recovery from Hurricane Harvey. An additional $47 million will be directed toward data collection and analysis, including the updating of flood hazard information across the state, development of the state flood plan, and public outreach efforts. In sum, the "rainy day fund" is finally allowed to live up to its nickname. The bill also lays out agency requirements for reporting use of federal funds and for transparency in flood project progress.

The rollout of SB 7 was very much in progress even before the Flood Infrastructure Fund was approved by voters. It was clear that a number of issues would require a great deal of deliberation, from the broad (the pathway that funds take, whether match for federal programs, complement to federal buyout programs, or implementing local projects that lack funding) to the specific (criteria for project prioritization). One of the key questions was the precise mix of grants and low-interest loans to be disbursed from the Flood Infrastructure Fund, which would affect the number of applicants who receive funding. The prioritization of repairing and rehabilitating existing infrastructure versus implementing new projects and activities also was a big question mark. Answers to all these have been provided for the first year of the program, but significant evolution is expected over the long term. Importantly, TWDB determined that establishing program guidelines through an annual Intended Use Plan rather than codifying them in rule preserves the flexibility to adjust based on experience as the program matures (TWDB 2019c).

Portions of the Texas Infrastructure Resiliency Fund will require significant coordination with TDEM, but TWDB will administer both this fund and the Flood Infrastructure Fund. This charge represents a major expansion in responsibility for the agency. And that is nowhere near the end of new assignments for TWDB.

Senate Bill 8

While SB 7 mobilizes new resources for flood projects, SB 8 builds a long-term framework to identify these projects and guide their development through a stakeholder-driven process. This bill drives toward what many optimistically hoped would be delivered by what ultimately became the State Flood Assessment: a comprehensive statewide plan to protect life and property from flooding.

What the State Flood Assessment did make clear, however, is that Texans strongly prefer that flood planning be conducted at a watershed scale to improve efficiency and capitalize on solutions that offer multiple benefits (TWDB 2019f). The new regional flood planning process will follow this approach, with 11 planning regions organized by river basin.

Within each planning group, stakeholders representing different unique local interests will hold public meetings and cooperatively develop regional plans to be completed by January 10, 2023. These evaluations of existing infrastructure and rankings of flood projects will be compiled into the first state flood plan no later than September 1, 2024 and every 5 years thereafter.

The regional and state plans will go through an approval process with TWDB, which will also provide ongoing facilitation, updated mapping, and data collection assistance. Thankfully, this major new program is right in TWDB's wheelhouse. The agency is already quite familiar with the state and regional water planning model from which it can draw inspiration. A major part of new flood work will lead to the development of new models and other technical tools. The completed plan will also feature an analysis of development in FEMA-defined "100-year" floodplains and recommendations on state policy changes to facilitate ongoing planning and implementation.

While the flood planning process has received most of the attention, SB 8 also delivers an important provision for improving the integrity of dams in Texas, some of which are nearing

80 years of age. The Texas State Soil and Water Conservation Board (TSSWCB) will be required to develop a plan for the flood control dams constructed through federal programs that the state agency now oversees. SB 500 provides $150 million to implement the resulting repair, rehabilitation, and maintenance plan, which will be updated every 10 years. TSSWCB will also provide annual updates to TWDB and work with TCEQ to identify the needs of certain non-federal dams.

As with SB 7, the rulemaking process provided significant clarification, but a great deal of detail remains to be worked out regarding SB 8 implementation. Legislation required TWDB to finalize flood planning regions before September 1, 2021, but this will happen much sooner. The initial candidates for regional alignment differed only with respect to the division of basins in the Panhandle, the partition of the Guadalupe and San Antonio rivers, and the affiliation of the Lavaca River Basin. Coastal basins are tricky! The preferred approach resulted in Brazos-San Bernard, Canadian-Red, Colorado-Lavaca, Guadalupe, Neches, Nueces, Rio Grande, Sabine, San Antonio, San Jacinto, and Trinity flood planning regions (TWDB 2019d). Neighboring regions along the Gulf coast are also encouraged to coordinate with one another (TWDB 2019e). With group finalization, adequate representation and the precise mix of regional interests and ex-officio agency representatives will be key.

Additional questions revolved around both the spatial and temporal scale of flood planning. Rules limit planning regions to considering flood strategies and projects with a drainage area of at least 1 square mile. Where portions of larger basins are worthy of special focus, groups may assign subgroups to look at watersheds at the Hydrological Unit Code (HUC)-8 level. These subgroups will also require the same stakeholder representation as the full group (TWDB 2019e). It will be interesting to see where local stormwater and drainage issues fit in. Regional water planning currently uses a 50-year time horizon. Regional flood plans will adopt a 30-year planning period and use associated development and population scenarios. They will also identify 10-year goals. These shorter timespans may provide the agility to incorporate further anticipated changes like those demonstrated in NOAA Atlas 14 (Perica et al. 2018) and data on changing sea levels, which groups are required to consider (TWDB 2019e).

Given the built-in flexibility and learning curve for SB 7 and SB 8 rules, public input will be a key feature throughout the process. In the mold of its development of the State Flood Assessment, TWDB wrapped up an ambitious series of statewide stakeholder workshops and a public feedback period in summer 2019. Additional public comments were invited as part of the required formal rulemaking procedures. This will be a long-term process, and there will be a great need for ongoing public participation in the regional planning process as groups are formed and begin work (TWDB 2019a).

UNCHARTED WATERS

Differences with Existing State Programs

A number of comparisons have been drawn between these new bills and both the regional water planning process and the State Water Implementation Fund for Texas (SWIFT). Indeed, flood planning guidance principles are similar to the guidance for regional and state water planning (TWDB 2019b). There are certainly similarities, but there are also key differences.

Unlike SWIFT, one unique aspect of the Flood Infrastructure Fund is the provision for grants that do not require repayment over time. Initial scenarios, such as a 75% grant/25% loan or 25% grant/75% loan breakdown, involve major tradeoffs in terms of debt burden versus how far funds can be stretched. Depending on the approach taken and the interest rate of loans, anywhere from $198 million to $731 million would be available over 20 years. For the 2020 Intended Use Plan, TWDB proposed several project categories with different financing breakdowns. Broadly, these represent a mix of grants (most requiring local match) ranging from 50 to 100%, with 0% interest loans available in all categories (TWDB 2019c).

The dynamics of the fund depend heavily on what criteria are applied to potential recipients. Prioritizing community financial need versus basing benefit-cost analyses on property values can yield very different results that often point in opposite directions. Additionally, roughly 47% of Texans reside in municipalities with a population over 100,000. Considering cities over 50,000, this rises to 54%. While these are much larger numbers than previous decades, this still means almost half of all Texans live in smaller political subdivisions that tend to lack the capacity to repay loans for expensive infrastructure projects and that also generally lack the dedicated staff to identify, plan, and coordinate the implementation of such projects. Such questions of how to address financial means promises to be a hot button issue in project selection. The statewide need is so vast, and the number of fault lines across flood history and socioeconomic factors is not small. For 2020, proposed categories are highly responsive to these questions, with highest grant percentages and highest prioritization going to areas outside a Metropolitan Statistical Area and those with annual median household income less than the statewide average (TWDB 2019c). In fact, consideration of Social Vulnerability Index scores is required. Other prioritization criteria include watershed planning and mapping updates, projects immediately protecting life and property, emergency need due to recent or imminent failure, regional benefit, completion date, existence of water supply benefit, and removal of structures from the floodplain. Project cost will be used as a tiebreaker, with preference going to the lower cost.

Once the application period opens, one of the big questions to watch will be the appetite for loans compared to grants. A loan with an interest rate of 0% will be difficult to beat. For future cycles, interest rates likely will come more into play. Some outside sources of financial assistance also offer low-interest loans, and political subdivisions may look elsewhere. Even if grants are the preferred path forward in 2020, will applicants be able to provide the 25-50% local matching funds required for most project categories? Critically, unlike financial assistance for water projects, most entities do not have a dedicated mechanism for recovering the cost of flood project loans. Water utility rates can foot the bill for funds through SWIFT, but that structure is generally not in place for funding flood projects outside of a relatively small number of special districts with taxing authority and those municipalities that have enacted a drainage charge. Where a cost recovery mechanism does exist, will those entities use funds directly for projects rather than pursuing loans? The regional planning process requires an examination of potential funding mechanisms for not just project development but also for operation and maintenance costs (TWDB 2019e). Expect serious discussion on the establishment of local revenue streams.

Another major contrast between water planning and flood planning is what some perceive as the overall objective itself: getting water versus getting rid of water. It appears that legislators have noticed the tensions that can arise between regions in the water planning process. SB 8 outlines requirements that no regional plan "negatively affects a neighboring area" (2019). Using a watershed approach and thanks to gravity, this is far less likely to occur between regions in the flood planning process. Unlike in water planning, the strongest tensions will likely arise within regions but between upstream and downstream interests. There are indications that this is already developing in some river basins. Rules reflect this reality by defining neighboring areas to include upstream and downstream portions of a given basin (TWDB 2019e). The preference between detention and conveyance is frequently tied to one's location in a watershed, and these preferences are strong. Planning flood projects without negative impacts on upstream or downstream areas will be a fine line to walk.

Given this potential reverse tug-of-war, it will also be interesting to watch what water planning-flood planning nexus develops. Water is water. "Too much" can quickly become "not enough," and flood waters pushed downstream may be less available to meet water supply needs.

The proposed list of representative flood planning stakeholders is a mirror image of that used in regional water planning, though stakeholder workshops did reveal a healthy appetite for including land trust and academic representation as well (TWDB 2019b). Like water planning, legislation for flood planning groups requires representation of the public interest. While some water supply projects can indeed skyrocket to become hot button issues, the majority of water planning concerns are likely keyed into much longer time horizons among the public. Water supply issues tend to take longer to express themselves. In contrast, devastating flood impacts can unfold in a matter of a few hours in a single afternoon.

When even one community is flooded, that can generate energy in a hurry, and that energy surely can endure. More than 2 years after the landfall of Hurricane Harvey, flood-related public meetings continue to experience capacity crowds in many locations. As a result, the communication process in the implementation of SB 8 will be critical. Ensuring all stakeholders feel genuinely heard and included will require an expert touch, with consistent response strategies after every future flood event. Whittling massive public interest down to a single representative will also be a real challenge. Expect a great deal of demand for additional planning group spots representing the public interest, and for some groups to expand membership further to include additional interests.

Amidst this complex dynamic, the role of thorough technical analysis will be paramount. The sense of urgency and hunger for visible action after a disaster are powerful. Yet in the wake of Hurricane Harvey, certain proposed solutions did not address the actual cause of flooding, and some ideas, if implemented, may actually cause an increase in flood risk.

Preliminary flood planning guidelines require that flood projects be based on the "best available" science and data (TWDB 2019a, TWDB 2019c). Maintaining this foundation, with consistent updates on an ongoing basis, should ensure strategies move in the right direction. Yet given the frequent need for adequate study to bump against the public desire for immediate project implementation, this evidence-based approach can involve a degree of tension. Clearly, navigating this process will demand superior communication, facilitation, and mediation prowess across every dimension.

A Rising Tide of Conservation Projects?

In floor discussion of the first amendment to SB 7, Senator Brandon Creighton acknowledged the work of his district's Bayou Land Conservancy in crafting a key component of the bill's language. A number of conservation organizations worked to amend language to include "nonstructural projects, including projects that use nature-based features to protect, mitigate, or reduce flood risk" (2019). TWDB stakeholder meeting materials reflect this mandate, and preliminary guidance principles included this suite of approaches prominently (TWDB 2019b). In fact, non-scientific audience polling at public meetings also indicated a strong preference for floodplain preservation and other nature-based solutions among all flood mitigation strategies.

Some intriguing possibilities revolve around such nature-based approaches. SWIFT legislation included sizable program targets for funding of water conservation and rural water projects (Jackson and Walker 2017). TWDB even prescribes water conservation as a tiebreaker in scoring water project applications (TWDB 2019g). SB 7 already makes specific provisions for the Flood Infrastructure Fund to support projects that "serve an area outside of a metropolitan statistical area" (2019). That means SWIFT and the Flood Infrastructure Fund differ in one last key aspect: targets for conservation. It would make sense that the water conservation programs emphasized in water planning be paralleled by a similar focus on a different kind of conservation in flood planning: land conservation. More than that, since TWDB also made the acquisition of land conservation agreements an eligible use of Clean Water State Revolving Fund resources, nature-based land conservation projects stand poised to be among the powerful few strategies that actually achieve the oft-emphasized goal of providing both flood mitigation and water supply benefits.

Nature-based, nonstructural approaches tend to be less expensive than structural approaches to implement and feature lower operation and maintenance costs over time (Dart 2019; Lightbody and Miller 2019). Furthermore, the performance of traditional infrastructure generally degrades over time, while natural strategies, particularly those with a restoration component, typically improve with project maturation. Additionally, land conservation approaches are far cheaper than acquisition (buyouts) after flooding of developed land has already occurred. Such projects also avoid the lengthy process of FEMA-supported buyouts that keeps flood survivors in limbo and sidestep the associated loss of life and property.

Among a multitude of conservation organizations across the state, there is no shortage of already-identified land conservation projects that could make a major dent in flood risk. The opportunity is even bigger. The U.S. Army Corps of Engineers (USACE) Engineering With Nature program acknowledges "nature offers us so many solutions to minimize flood risk" (Kuzmitski 2019). Including nature-based approaches as key elements of every flood project, as promoted by the Engineering With Nature initiative, seems a critical strategy.

Defining Success and Future Challenges

Regardless of the emphasis chosen by different regional groups, big conversations will revolve around how flood plan success is even defined. What is the appropriate standard (TWDB 2019b)? Water planning is based on a hypothetical repeat of the "drought of record," a historically severe dry period during the 1950s (TWDB 2017). However, investigation of long-lived Texas trees indicates this approach severely underestimates what the region has endured in previous centuries (Cleaveland et al. 2011).

A similar challenge exists with flooding. Despite the scarce probability of Hurricane Harvey's torrential rains, streamflows generated by even this storm were far less severe than would be expected in many watersheds (Watson et al. 2018). How, therefore, should regional groups think about managing risk to life and property? A much-needed change in terminology from the "100-year flood" to "1.0% annual chance flood" may help facilitate a better public understanding of flood risk (TWDB 2019e). Significant discussion will revolve around whether a historical benchmark or some stricter probabilistic measure is a better fit.

Over $1.6 billion was assigned to new flood mitigation initiatives by the 86th Legislature. An additional $200 million was allocated to the General Land Office (GLO) to support dredging and USACE studies. This is indeed a substantial withdrawal from the Economic Stabilization Fund. Yet even the State Flood Assessment acknowledged that a 10-year, $31.5 billion need means that communities face a shortfall of $18 billion to $26.6 billion in financial assistance, and these estimates do not even take into account projects associated with Hurricane Harvey (and Tropical Storm Imelda) recovery or certain major projects across the state (TWDB 2019f). Flood legislation passed in 2019 is an important first step, but the gap between appropriated funds and remaining needs is huge. Tremendous interest and pressure will be focused on future legislative sessions to maximize the productivity of these funds and follow through with significant additional resources. In addition to funds, will something more be required of Texans in the form of shifts in expectations and living with water? Through the flood planning process, what necessary changes to current floodplain management, land use regulations, and economic development practices will be recommended?

CONCLUSIONS

As implementation ramps up for all flood legislation, be prepared for an iterative process with plenty of learning opportunities. This is particularly true for SB 7 and SB 8. No other state has yet chosen to dive into flood risk management with such a systematic approach—one that simultaneously funds flood hazard identification, watershed-based planning, and mitigation projects. Even the current state water planning process has only been in place since 1997. SWIFT has been in action far shorter. SB 7 and SB 8 are each significantly shorter than the enabling legislation for both state water planning and SWIFT and leave much to be fleshed out. Lessons learned through these efforts will absolutely help smooth the road for flood planning, but it is fully expected that there will be some kinks to work through.

As with any massive and ambitious effort, the success of these new programs will depend on sustained stakeholder engagement at every single step in the process. Early signs suggest the beginnings of a move in the right direction. Yet from the initial stakeholder meetings all the way through the prioritization of funds and long-term activity within regional flood planning groups to future legislative action, the decision of whether the 86th Legislature becomes a watershed moment or is seen as yet another drop in the bucket ultimately rests with the people of Texas.

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APPENDIX A. ISSUES AND CONCERNS ADDRESSED BY FLOOD-RELATED BILLS INTRODUCED IN THE 86TH TEXAS LEGISLATURE

- Property tax
- Debris removal
- Emergency alerts
- Dam operations
- Casino gaming
- Public meeting procedures
- Personal identification
- Climate change
- Infrastructure assessment
- Loan interest rates
- Mail carriers
- Property insurance
- Outreach programs
- Housing recovery
- Government contractors
- Buying a home
- Legal counsel
- Government assistance forms
- Aquifer storage and recovery
- Affordable housing
- Handguns
- Sand and gravel mining
- Border wall construction
- Feeding state employees
- Federal funds
- Business advisory council
- Recovery program audits
- Leasing property
- Education finance
- Health care volunteers
- State agency coordination
- Public office residency requirements
- Permit and inspection fees
- Volunteer repairs
- Supplemental nutrition assistance
- Health care accessibility

- Suspension of regulations
- Landfills
- Mosquito control
- Oil and gas spill prevention
- Alcohol disposal
- Immunization records
- Government communications
- Assistance case management
- Government expenditure records
- Road construction
- Internet access
- Aboveground storage tanks
- Peace officers
- Vehicle salvage, repair, and assembly
- Telecommunications
- City legal immunity
- Vocational apprenticeship
- Family and protective services
- Price gouging
- Vehicle registration
- Local drainage districts
- Trade service fraud
- Personal information privacy
- Growth of state expenditures
- Land banking
- State employee leave
- Green infrastructure
- Infrastructure security
- Disease prevention
- Emergency management personnel
- Recycling
- Food banks
- Strategic planning
- Drone operation
- Cemeteries
- Volunteer fire departments
- Faith-based disaster assistance
- Utility billing
- Land easements and rights-of-way
- Teacher salaries
- Luxury vehicles
- Elderly and disabled persons

APPENDIX B. FLOOD-RELATED BILLS ORIGINATING IN THE HOUSE PASSED BY THE 86TH TEXAS LEGISLATURE

HB 5 (Phelan) requires TDEM to develop a catastrophic debris management plan and model guide for political subdivisions in the event of a disaster and supports the creation of associated training programs and a wet debris study group.

HB 6 (Morrison) prescribes a disaster recovery task force within TDEM to provide specialized assistance and facilitate long-term recovery efforts.

HB 7 (Morrison) requires the Office of Governor to compile a list of statutes and rules that may be suspended in the event of disaster and prescribes TDEM to assist political subdivisions with common disaster-related service contracts.

HB 26 (Metcalf) requires dam operators to include a notice requirement in their emergency action plans dictating that affected persons and communities downstream from reservoirs receive detailed notice of water releases during natural disasters.

HB 137 (Hinojosa) requires TCEQ to provide a report on high and significant hazard dams to the emergency management representative in the area where the dam is located.

HB 492 (Shine) allows income-producing personal property and property improvements to qualify for a property tax exemption if they are located in a declared disaster area and sustain at least 15% damage.

HB 720 (Larson) allows unappropriated water, including stormwater and floodwater, to be used for aquifer recharge.

HB 721 (Larson) directs TWDB to conduct studies of such aquifer storage and recovery projects.

HB 831 (Huberty) clarifies the eligibility of officeholders to run for election who have been displaced by a disaster.

HB 852 (Holland) prohibits municipalities from requiring information on the value of residential dwellings for the assessment of permits and fees, except as required by the National Flood Insurance Program (NFIP).

HB 907 (Huberty) increases fines for unregistered aggregate producing operations.

HB 1052 (Larson) allows certain TWDB funds to be used in support of underground storage of floodwaters.

HB 1177 (Phelan) allows licensed Texans to carry their firearms when their property is under a mandatory evacuation.

HB 1256 (Phelan) directs the Department of State Health Services to provide direct access to first responder immunization information in the event of a disaster.

HB 1263 (Ed Thompson) authorizes Brazoria Drainage District Number 4 to order private property owners to maintain infrastructure to allow access for drainage maintenance.

HB 1306 (Frullo) provides for additional flood insurance coverage by surplus lines insurers.

HB 1307 (Hinojosa) directs TDEM to create an electronic disaster case management system.

HB 1755 (Ed Thompson) clarifies the titling and registration of assembled vehicles and former military vehicles to prohibit the use of flood-damaged electrical or mechanical components.

HB 1820 (Bailes) creates the Liberty County Drainage District.

HB 1824 (Murr) waives the permit requirement to remove sediments from the San Jacinto River and its tributaries.

HB 2305 (Morrison) establishes a work group through TDEM to improve the training and credentialing of emergency management personnel.

HB 2310 (Vo) creates an information sharing process regarding flood-damaged vehicles repaired using FEMA funds.

HB 2320 (Paul) facilitates the integration of telecommunications providers into disaster planning and recovery and requires TDEM to identify strategies for hardening utility facilities and critical infrastructure. This legislation also increases the availability, accountability, and oversight of building trade services professionals while promoting public awareness of utility payment assistance during a disaster.

HB 2325 (Metcalf) coordinates information management communications strategies among government agencies and the public during and after a disaster.

HB 2335 (Walle) directs the Health and Human Services Commission to work with county judges to establish a list of sites that can maintain accessibility to supplemental nutrition assistance program benefits after a natural disaster.

HB 2340 (Dominguez) encourages federal-state partnerships to improve information sharing and efficiency and also creates an unmanned aircraft study group to identify state laws that may be changed to improve the use of drones in disaster response.

HB 2345 (Walle) establishes the Institute for a Disaster Resilient Texas under the Texas A&M University System.

HB 2634 (Flynn) creates specifications for developing cemeteries in relation to areas used for flood control.

HB 2784 (Phelan) directs the Texas Workforce Commission to create the Texas Industry-Recognized Apprenticeship Programs Grant Program to engage the private sector in boosting the state's specialized industrial workforce to respond to the needs of Hurricane Harvey.

HB 3070 (Ken King) authorizes volunteer fire departments to submit an emergency request to the Rural VFD Assistance Program to repair or replace equipment damaged or lost in responding to a disaster.

HB 3175 (Deshotel) mandates the confidentiality of personal information used in disaster recovery fund applications.

HB 3317 (Zerwas) exempts the disaster recovery loan account, the Flood Infrastructure Fund, the Texas Infrastructure Resiliency Fund, and the disaster reinvestment and infrastructure planning revolving fund from becoming part of the General Revenue Fund.

HB 3365 (Paul) provides civil liability protections (Good Samaritan laws) to charitable organizations, emergency response agencies, and associated volunteers who assist in disaster response.

HB 3384 (Shine) authorizes the Texas Comptroller of Public Accounts to provide for a limited-scope review of appraisal districts in disaster areas.

HB 3616 (Hunter) creates a faith-based organization task force to help TDEM coordinate with faith-based organizations in disaster response and recovery.

HB 3668 (Walle) establishes a grant program for local food banks to build capacity to respond to disasters.

HB 3782 (Harless) establishes a process for the Harris County Flood Control District to remove personal property from District land or easement, for the purpose of flood infrastructure maintenance, after notification.

HB 3815 (Morrison) requires the disclosure to homebuyers of previous flood history, flood insurance coverage, and location within flood-prone areas.

HB 3913 (Huberty) creates an exemption from public information laws at the state level for personal information obtained by certain flood control districts.

HB 4726 (Dominguez) creates the Cameron County Flood Control District.

APPENDIX C. FLOOD-RELATED BILLS ORIGINATING IN THE SENATE PASSED BY THE 86TH TEXAS LEGISLATURE

SB 2 (Bettencourt) prescribes a number of changes to property taxation procedures, including those in declared disaster areas.

SB 6 (Kolkhorst) addresses a number of disaster response and recovery issues, including wet debris management, training and credentialing of emergency management personnel and political officers, a Disaster Recovery Loan Program through TDEM, and the potential creation of a single automated intake system for obtaining disaster assistance from multiple state and federal programs.

SB 7 (Creighton) creates the Flood Infrastructure Fund through TWDB to provide financial assistance for flood projects. The legislation also creates the Texas Infrastructure Resiliency Fund to serve as a matching account to leverage federal dollars in addition to supporting data collection and mitigation projects identified in future state flood plans.

SB 8 (Perry) directs TWDB to develop a comprehensive state flood plan every 5 years based on regional flood plans. The bill also requires TWDB to designate these planning regions and provide assistance to each through the development process. TSSWCB is charged with creating a repair and maintenance plan for flood control dams every 10 years (with coordination from TWDB and TCEQ).

SB 285 (Miles) directs the Governor to issue an annual hurricane preparedness proclamation before each hurricane season (June 1), to publish a report on state agencies' preparedness following this proclamation, and to ensure agency preparedness through executive order. GLO will conduct an annual public information campaign addressing available housing assistance in the event of a hurricane or flood.

SB 289 (Lucio) requires TDEM to develop a Disaster Recovery Task Force for use in long-term disaster recovery and future preparation. It also calls on local governments to adopt local housing recovery plans with guidance from the Hazard Reduction and Recovery Center within the Texas A&M University System.

SB 300 (Miles) authorizes GLO to enter into four-year indefinite quantity contracts with vendors for services in the wake of a disaster.

SB 339 (Huffman) requires the standard seller's disclosure for residential purchases to include flood insurance status, flooding history, and location in flood-prone areas.

SB 416 (Huffman) authorizes the attorney general to provide legal counsel on disaster-related issues to local governments in a disaster area.

SB 442 (Hancock) requires insurance providers to inform policyholders when their property insurance does not cover flooding and to inform of the potential need to purchase flood insurance.

SB 493 (Alvarado) permits the allocation of additional low-income housing tax credits to one portion of the City of Houston that has been declared a disaster area.

SB 494 (Huffman) allows the temporary suspension of public information law requirements for government bodies impacted by a disaster.

SB 500 (Nelson) makes supplemental appropriations, with specifications for numerous flooding and disaster programs.

SB 537 (Kolkhorst) allows the Texas Department of Transportation to purchase food and beverage for employees unable to leave their assignment area during disaster response.

SB 563 (Perry) requires agencies distributing federal funds for flood projects to submit quarterly reports to TWDB.

SB 752 (Huffman) reduces civil liability for volunteer health care professionals who provide services related to a disaster.

SB 799 (Alvarado) establishes a business advisory council to guide state and local governments in helping businesses recovery from a disaster. It also transfers administration of TDEM from the Department of Public Safety to the Texas A&M University System.

SB 812 (Lucio) clarifies that home repairs or replacements made due to Hurricane Harvey are not considered new improvements for the purpose of property taxation.

SB 981 (Kolkhorst) facilitates greater collaboration between state and local officials to administer the disaster supplemental nutrition assistance program.

SB 982 (Kolkhorst) directs TDEM to develop a plan for emergency shelter for specialty care populations in a disaster, facilitate coordination between local governments and volunteer networks, and create state-controlled volunteer mobile medical units in counties where volunteer networks are lacking. It also establishes a task force on disaster issues affecting elderly persons and persons with disabilities.

SB 986 (Kolkhorst) directs the Comptroller of Public Accounts to update the contract management guide to include standards and information related to disaster response, including that of debris management, infrastructure repair and construction, and preparation.

SB 1113 (Lucio) authorizes local health departments in a disaster area to apply for a waiver to allow unlicensed staff to apply mosquito control pesticides.

SB 1210 (Hancock) establishes a process for the disposal of flood-damaged alcoholic beverages.

SB 1312 (Lucio) directs state agencies to study vector-borne disease issues along the Texas-Mexico border and makes changes to some mosquito control activities.

SB 2168 (Watson) adjusts criteria for forgiving local match requirements for economically disadvantaged counties that have suffered repeat disasters.

SB 2212 (Taylor) authorizes three coastal drainage districts to enter into a partnership with USACE to implement coastal flood mitigation projects.

SB 2452 (Lucio) provides for the Economically Distressed Areas Program for water supply and sewer services and directs TWDB to maximize program effectiveness through bond proceeds in conjunction with other sources of financial assistance.